As a farmer who paid $265 a ton for anhydrous ammonia back in 1975, let me tell you personally how glad I am to see you discussing the genetic engineering of nitrogen fixation.

I fully expect when I return to the real world from Washington in four or eight years and resume my career in farming -- that dependence on nitrogen will be much reduced from the past. I'm sure you'll fix that for me.

It seems to me that the discussion you are engaged in is some of the most promising research that I know of.

I say this for several reasons, all of which bear on the new age that American and world agriculture have entered.

It is a homily that we're creating a lot more people on this globe, but we're not creating more land. Yet it's true. It's also true, and it was brought home to us in the recent desertification conference in Africa, that we're rapidly wasting away much of our arable land through misuse and lack of conservation practices. We're also urbanizing prime farmland at a rate we cannot long afford.

We cannot, in short, look to new lands to feed a growing population, as our ancestors who came to the New World did.

Remarks by Secretary of Agriculture Bob Bergland to Conference on "Genetic Engineering for Nitrogen Fixation" at National Academy of Sciences Auditorium, Washington, D. C. October 6, 1977 at 4:00 p.m.

Here in this country, the world's breadbasket, agriculture is subject to a three-fold assault that I can sum up like this:

-- An energy shortage. This has many facets. Energy has doubled in price over the past few years. The days of lavish use of fertilizers and petroleum--in brief, energy-intensive agriculture--are rapidly changing, with possible profound effects on food production.

-- This energy problem here in the United States affects agriculture in yet another way: Competition for scarce and fragile western land underlain with coal is increasing; Competition for scarce water, needed for both urban use and energy production in the west--coal gasification, oil shale production, coal slurry--is increasing and will impact agriculture even more in the future.

Finally, weather: As you know, I am not a scientist, so I won't pontificate on scientific matters before this distinguished group. But the fact is, from everything I have studied, we have enjoyed an exceptionally good pattern of weather for crop production over the past decades. We may well be entering a similar long-range period of unfavorable weather. No one really knows, but it is a contingency that we have to crank into our planning.

The sum total of these factors I've enumerated is this: That the practices of the past will not work in the future--past energy practices won't work; past land use practices won't work; and past research priorities won't work.

Research in nitrogen fixation has a high priority in this Administration. Our appropriations for fiscal 1978 include $15 million for competitive grants in agricultural research, and included in these high-priority needs are research on nitrogen fixation and genetic engineering for plants. We're encouraging scientific institutions outside the USDA - State agricultural experiment station system to also compete for these funds.

Despite the hopes I expressed earlier for free nitrogen for the Bergland farm in Roseau, I am well aware of the long time spans, the years, sometimes decades, that lie behind what the newspapers describe as a "research breakthrough."

Hybrid corn, which became generally available on the commercial market in the nineteen-thirties, reached the farmer some 15 years after the basic genetic discoveries were know to scientists like you.

Wheat geneticists have worked 30 years on developing hybird wheat, but the farmers still do not have econmically acceptable hybrids. The efforts continue, of course, because scientists think it reasonable that such hybrids could yield as much as 30 percent more than the best varieties we now have available.

Another example is soybeans--we've sought a yield breakthrough for years, but it's still beyond our grasp. The yield increases have come, in the main, because farmers have planted on better land.

The time factor, plus the other factors that I have mentioned--increasing world population, competition for scarce land and scarce energy...unknown world weather patterns in the future--make your work, research, all the more important.

We are concerned, as we should be, about the leveling off of crop yields. In recent years, yield increases have resulted in large measure from increased fertilization rather than from genetic improvement. Some of this leveling off, it is true, may be due to unfavorable weather, but some if it almost certainly is due to the fact that no basic breakthroughs in improvement of crop varieties have come along recently.

We're fortunate in this country to have a delivery system that can spread the discoveries of the scientific community down to the fence row. It's a system we pioneered here in the United States, starting in the last century. The system includes scientists like many of you in the audience, the Extension Services in every state, USDA and State agricultural experiment station scientists...all working as a team...testing and refining basic knowledge to put it to man's use.

We're so used to this system...it's been around so long and we have been such a part of it...that I think we often overlook just how valuable it is and how rare it is in the world.

If this system were spread throughout the world, tailored in each case to the existing level of farm technology, we wouldn't be worrying about how to feed several more billions of people in another few decades. The means to do so would be at hand.

Unfortunately, as all of you know, they're not, and developing such a delivery system is one of the major problems facing us in our future foreign aid efforts.

This is not to say that our research and delivery system cannot be improved. I think it can. I have taken a first step in this direction in a Departmental reorganization announced yesterday, which--among other things--pulls together the now-fragmented research and education activities of the department into a single agency.

In brief, this reorganization establishes a new Food and Agriculture Science and Education Administration headed by a Level V director of Science and Education, yet to be named, carries out the Congressional mandate under Title 14 The reorganization of the new Food and Agriculture Act. That act requires us to "increase cooperation and coordination in the performance of agricultural research by Federal departments and agencies, the states, State agricultural experiment stations, colleges and universities and user groups."

The new agency has two major units. The first is the Agricultural Research Service. The second, the Cooperative Science and Education Service--CSES--assumes the present work of the CSRS, Extension Service and the National Agricultural Library.

A planning staff for research, education and teaching, will report to the Director of Science and Education.

The reorganized agencies will continue to report to assistant secretary Rupert Cutler.

This reorganization, I believe, will help USDA fulfill its responsibilities as the lead agency for food, nutrition and agricultural sciences.

You are taking steps at this conference to improve your efforts. This public meeting itself is bringing together scientists, the public and its policy-making representatives to participate in discussions on how science can best serve mankind.

This is good. Too long -- in C.P. Snow's term -- have the "Two Cultures" of science and non-scientists been isolated one from the other. Too long have they spoken separate languages that have inhibited the evolvement of sound and rational public policy.

Perhaps if there had been more dialogue between scientists and laymen the subject you are discussing today, nitrogen fixation, might be further along to the benefit of us all.

We've known of the symbiotic relationship between nitrogen-fixing bateria and legumes since the turn of the century.

Even before the First World War we imported natural fertilizer from Chile. When this supply was cut off, the War Department built a fixed-nitrogen research laboratory, later transferred to the Department of Agriculture.

Research in biological nitrogen fixation waxed and waned, being de-emphasized after World War I, when industrial production of commercial fertilizer began. In the nineteen-fifties, with low petroleum prices, the Department's nitrogen fixation research was further diminished.

Now we're attempting to pick up where we left off.

I'm proud that my Department has had some part in this work. USDA scientists have collected and evaluated Rhizobium germplasm since the turn of the century. This collection at the Beltsville Agricultural Research Center is one of the most valuable in the world, containing as it does Rhizobium strains that will nodulate all major legume crops, both in this country and in the world.

There is no question that your work is of the highest importance, given world population trends and the limited availability of petroleum.

I wish you well in your work in the years ahead.

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